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Education, Race and Revealed Attitudes Towards Homosexual Couples

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Abstract

We examine the varying influence of the presence of homosexual couples on average home prices with different compositions of educational attainment and race. We find that a higher number of homosexuals in relatively higher educated areas is associated with higher average prices and lower average prices in areas with less educated residents. The magnitude of positive influence and negative influence is lower when the number of black residents increases. This suggests that education is associated with a greater revealed tolerance for homosexuals, but the influence of education is less for areas with a higher percent black, perhaps due to homophily.

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1 Introduction

Prior to the early 1990's, homosexuality was considered to be morally wrong by the majority of individuals in the United States (Kozloski, 2010). Since then, this sentiment has been steadily decreasing with currently 33% voicing disapproval.[1] One leading explanation for the decline is the increased levels of educational attainment (Treas, 2002). It has been proposed that individuals with a college degree are more welcoming towards non-conformist positions and social group minorities, including homosexuals (Phelan et al., 1995).

Education is thought to be associated with increased tolerance towards minority groups and opinions. This is thought to occur due to individuals from socio-economic backgrounds that are predictive of tolerant attitudes "sorting" themselves into college (Campbell, 2009), increased cognitive reasoning as a result of attending college (Bobo and Licar, 1989; Jesilow and Meyer, 2001) or socialization. The latter hypothesis proposes that individuals may be conforming to the expectation of their peers when expressing their opinion. College graduates perceive their peer group to be more liberal than the general population and have a desire to signal similar attitudes (Phelan et al., 1995). This expectation may influence the perceived social correctness of particular opinion positions on social issues, leading to voiced opinions which reflect the socially acceptable answer rather than the true sentiment of the individual.

If the first or second mechanism correctly describes the relationship between education and attitudes towards homosexuals, we would expect the behavior of the population without a college degree to reflect stronger disapproval or prejudice against homosexuals relative to the behavior of the college educated populace. In the housing market, prejudicial attitudes are inferred through a lower willingness to pay for houses in areas with higher concentrations of homosexuals. If instead the stated opinion correlation is driven by socialization, it is uncertain whether college educated individuals are less disapproving of homosexuality, and consequently we may not observe any systematic differences in the influence of homosexuals

[1]This statistic is taken from the Pew Global 2011 survey `http://www.pewglobal.org/2011/11/17/the-american-western-european-values-gap/`.

on house prices.

Another consideration of the relationship between education and social attitudes is that education may not influence all populations uniformly. Minorities may engage in homophily, the tendency of individuals to form social groups with those who are similar to themselves, to a greater extent while in college (McPherson et al., 2001; McClintock, 2010; Franz et al., 2010). The influence of education on social attitudes, which are thought to converge towards increased tolerance, is partially due to the increased interactions among diverse individuals. If true, the tendency to engage in homophily may dilute or slow down the proposed convergence of attitudes(Golub and Jackson, 2012). This potentially decreases the influence of higher education on attitudes towards homosexuals for these groups.

The racial component of the influence of education on social attitudes is particularly important due to the positive link between diversity and growth and development (Florida and Gates, 2004). If indeed part of the economic advantage of graduating from college is an increased willingness to consider non-conformist ideas and positions, and this advantage is not being fully realized to the same extent for some minority groups (e.g. blacks), the economic racial gap may persist and even grow larger.

To answer whether higher levels of educational attainment influence revealed social attitudes towards homosexuals, and if this influence is different for the black community, we use a hedonic price approach in the housing market. Individuals who disapprove of homosexuality may be reluctance to live near a homosexual couple, resulting in a lower willingness to pay for a house where a greater number of homosexual couples reside. To our knowledge we are the first to consider racial differences in observed attitudes towards homosexuals among those with different levels of average education. This stands in contrast to stated preferences, which may be convoluted if the socialization hypothesis is correct.

We employ a housing dataset of over 90,000 housing transactions to detect the influence of the presence of homosexual couples on the willingness to pay for a house and how this influence changes for different compositions of educational attainment and race. In areas

with one standard deviation above the mean percent college graduates, an increased number of homosexual couples is associated with higher average house prices. In areas with one standard deviation below the mean percent of college educated the association is negative, implying a lower average willingness to pay to live in a house located in an area with greater number of homosexual couples. This corroborates the stated preference finding that education is positively related to tolerance towards homosexuals. Furthermore, our finding suggests that the socialization hypothesis of education does not appear to be driving the differences in stated opinions towards homosexuals resulting from different levels of educational attainment.

With regards to racial differences of education on observed attitudes, we find that the education is significantly less influential on attitudes towards homosexuals in areas that have a relatively higher concentration of blacks. The negative association between average house prices and homosexual couples in areas with a smaller percent of college educated individuals is less pronounced in areas with a greater concentration of blacks than in areas with higher percent of whites. Specifically, in areas where educational attainment is one standard deviation below the mean, an increase in homosexual coupled households is associated with an average reduction in house prices of $1,430 in areas with relatively higher percent of black residents and a reduction of $2,999 in areas with relatively higher percent of whites.

Among the higher educated areas (one standard deviation above the mean), the positive association between average house price and more homosexual couples is less pronounced in areas with a greater percent of blacks. An increase in homosexual coupled households is associated with a higher average house price of $2,773 in these higher educated areas with relatively more whites compared to an associated average increase of $1,219 in areas where blacks are relatively more predominant. Taken together, education does appear to influence the way individuals view homosexuality, although this influence is less pronounced in areas with relatively higher percent of black residents. College attainment appears to have a significantly greater influence on the association between average house price and number

of homosexual couples in areas predominantly white. When comparing high versus low educated areas when the racial composition is held constant, areas with relatively less blacks show a greater variance in the association between house price and number of homosexual couples. The lower variation in attitudes among blacks relative to whites may be evidence of a greater degree of homophily among blacks in college.

2 Literature Review

2.1 Education and Tolerance

The link between education and increased tolerance of nonconformist views has a lengthly history in the academic literature, recently summarized by Ohlander et al. (2005). Early on it was shown that education changes an individual's values and beliefs (Feldman, 1969; Hyman et al., 1975; Funk and Willits, 1987; Alwin, 1991) and later suggested that education increases compassion for other positions (Jenssen and Engesbak, 1994; Gaasholt and Togeby, 1995). This observed association between education and tolerance gave way to the belief that education can be an important component of social change (Yankelovich, 1976).

Since the 1990s, homosexuality has been transformed in public discourse from primarily a moral issue to an issue framed as a moral *and* civil liberty issue (Bennet, 2000; Jenness and Grattet, 2001; Treas, 2004). Education has been demonstrated to be positively correlated with support for minority groups' civil liberties and a greater intolerance for civil inequality toward groups with minority opinions (Bobo and Licar, 1989). Individuals with higher levels of education are more likely to support free speech of controversial opinions, profess greater compassion for unpopular viewpoints and publicly oppose violation of civil liberties by government authorities (Jesilow and Meyer, 2001).

Education is thought to be associated with increased tolerance in potentially three ways (Phelan et al., 1995). In the sorting model educational attainment is a reflection of social position (Campbell, 2009). The level of educational attainment does not influence civic

behavior but rather is an association resulting from the strong influence that social class has on both the level of educational attainment and the degree of civic participation and openness to dissenting opinions.

The causal hypothesis asserts that education increases cognitive reasoning and the willingness to consider dissenting opinions more thoroughly. Early work by Hyman et al. (1975); Nunn et al. (1978); Himmelstein and Jr. (1988) argues that education fundamentally changes how individuals view the world and their thought process, referred to as the "development model". Later evidence suggested that indeed cognitive reasoning is positively correlated with increased quantitative reasoning and vocabulary after controlling for background characteristics (Alwin, 1991; Kerckhoff et al., 2001). These two hypothesis could reasonably imply that as education rates in the US increase, a corresponding increase in tolerance of homosexuality is a logical consequence.

As previously mentioned, a third mechanism suggests that those with higher levels of education are instead "socialized" to express certain opinions (Selznick and Steinberg, 1969; Weil, 1985; Phelan et al., 1995). College attendance naturally groups individuals into peer groups that are perceived to have more liberal views than the general population. This perception leads people within these groups to feel pressured to express similar sentiments, even if they do not personally agree. These opinions are typically more liberal and open to minority groups, including homosexuals, compared to the non-educated populace.

This mechanism creates a tension regarding the effect of education with the first two hypothesis, suggesting that education may not fundamentally cause, or be associated with, more tolerant attitudes. Instead, the perceived association may not even exist in revealed attitudes, only stated attitudes. This is particularly troublesome given that the majority of literature relies on stated preference survey data to detect attitudes towards homosexuals. If the socialization hypothesis is correct, the perception of increased tolerance among the higher educated populace may be misleading.

2.2 Homophily, Race and Education

Among the proposed mechanisms of influence on attitudes through education, all involve individuals forming social connections with their peers. In college, further away from familial influence, these connections are thought to be particularly important in transmission of social values and expectations. Consequently, the formation of social groups should influence the strength of effect of college on an individuals' peer group values, including tolerance of homosexuality.

If an increased tolerance for homosexuals among the college educated population is a result of increased exposure to diverse ideas and populations, intolerant students who form connections with individuals who do not share similar opinions may become more tolerant after attending college than those who do not. The tendency to form social connections and peer groups with individuals who are disproportionately similar to oneself, homophily, may limit the level of observed increased tolerance in general (McPherson et al., 2001). Golub and Jackson (2012) discuss the implications that homophily has in convergence of broad consensus within peer groups. In particular, they find that the consensus of opinion will be reached much *slower* in populations that engage in higher levels of homophily. This has implications for considering the differences in attitudes towards homosexuals between the college educated population, who may form groups with those dissimilar to themselves, and the non college educated population, who may have a less diverse peer group. If there are racial differences in the tendency to form more or less diverse peer groups, both among the college educated and non college educated populations, this may influence the variation among blacks' degree of tolerance towards homosexuals relative to the variation among whites.

Homophily can be classified as either "opportunity-based", when sorting is due to daily interactions naturally occurring with individuals who posses similar characteristics, or "choice-based", in which individuals actively seek out similar individuals even when there are opportunities to interact with dissimilar populations (Franz et al., 2010). Opportunity-based

homophily is naturally limited for small minority populations, who may rarely meet someone of the same race or culture. Larger minority groups for whom there is ample opportunity to meet individuals of the same race or culture are more likely to engage in both opportunity based homophily *and* choice based homophily relative to smaller minority groups and the majority population (Franz et al., 2010).

Currarini et al. (2007) develop a theoretical model of friendships and peer groups to discuss the degree of homophily. One implication of the model is that the middle sized group within an entire population will engage in the highest level of homophily. Taken together, Franz et al. (2010); Currarini et al. (2007) imply that blacks, who are the largest racial minority group within the US, may engage in homophily more than whites. This conclusion is supported empirically by McClintock (2010), who found that blacks were more likely than whites, asians or hispanics to engage in homophily in the dating scene while in college.

Given these results, we may expect that the influence of college on social values, including attitudes towards homosexuals, is less pronounced among blacks than whites. This implies that when comparing attitudes of college graduates in general to non college graduates, there may be less variation in attitudes between the two groups for blacks than whites.

2.3 Prejudice and the Housing Market

Blacks are thought to disapprove of homosexuality to a greater extent than whites (Loftus, 2001; Egan and Sherrill, 2005; Haider-Markel and Joslyn, 2008; Lax and Phillips, 2009). This disapproval, expressed primarily through the use of survey data, is thought to be rooted in potentially three sources. One is the belief that blacks do not want to elevate homosexual rights as a civil right on par with racial civil rights (Gates, 1999). The second is that the black community as a cultural norm has an attitude of stronger intolerance toward homosexuality (Brandt, 1999), while the third maintains that the association is due to religion (Talyor and Chatters, 1996; Sherkat et al., 2011; Jr., 2009). If blacks are more religious than the general

population, and religious participation is negatively correlated with tolerance of homosexuals, than the negative association is due to religion rather than cultural norms.

If the association is due to the latter reasons, we expect this preference to manifest itself empirically. Although survey data is useful, it is potentially confounded by an individual's desire to give the socially acceptable answer. This concern is heightened when considering the influence of college in particular due to the socialization hypothesis of observed social attitudes. We instead employ an empirical analysis of observed attitudes by considering the housing market.

If indeed some groups are disapproving of homosexuality, this preference should be manifested in the desire to live apart from homosexuals. It is possible to use housing prices and characteristics to derive a direct monetary value that individuals place on having neighbors with particular characteristics. This hedonic model was first considered in the housing market by Bailey (1966) and later extended by Yinger (1976). In the model a house is thought of as a bundle of goods and, given a large enough sample size, it is possible to hold all characteristics except one constant and observe the resulting change in house price. The change in house price is taken to be the willingness to pay for that particular characteristic.

This model has been used extensively to detail both prejudice and discrimination against blacks, summarized by Myers (2004). In the housing market, prejudice is evidenced by an individual's lower willingness to pay less for house in an area with a greater concentration of the group in question relative to a similar house located in an area with a lower concentration. Homosexuals feel that they are the target of prejudice with at least 10% reporting that they have experienced direct discrimination in the housing or labor market (Herek, 2009). However, evidence of prejudice in the housing market has been mixed.

Florida and Mellander (2010) find that gays and bohemians are correlated with higher, not lower, house prices. They suggest that areas that are open to gays and bohemians are open to other ideas and attitudes which are correlated with higher growth and, consequently, higher house prices. Similarly, Bell and Binnie (2004); Black et al. (2002) find that

homosexuals live in high amenity areas which are also correlated with higher house prices. However, Christafore and Leguizamon (2012) find that homosexuals do experience prejudice in the housing market in conservative areas but not liberal areas. With respect to racial differences, there is evidence that blacks may be more prejudiced against homosexuals than whites (Leguizamon et al., 2013).

3 Methodology

We use a hedonic model to capture the influence of house and neighborhood characteristics on home prices. The use of hedonics is complicated by the fact that house price variation is affected by the interrelatedness of home prices. House prices are often influenced by changes in the prices of neighboring houses (Anselin, 1988). To control for this location effect, we estimate the hedonic price model using standard ordinary least squares, but cluster the standard errors at the census tract level .[2] The model is specified as follows:

$$\begin{aligned} Ln(HousePrice) = {} & \alpha + \beta Pct_{Black} + \beta_1 Homosexual \\ & + \beta_2 Pct_{Educated} + \beta_3 Pct_{Black*Homosexual} + \beta_4 Pct_{Black*Pct_Educated} \\ & + \beta_4 Homosexual * Pct_{Educated} + \beta_5 Pct_{Black} * Pct_{Educated*Homosexual} \\ & + \beta_i House_{Characteristic_i} + \beta_j OtherLocationCharacteristic_j + MSAdummy + \epsilon \end{aligned} \tag{1}$$

where $House_{Characteristics}$ include age, age squared, lot size, lot size squared, house size, bedrooms, bathrooms, distance to the Central Business District, distance to the nearest environmental hazard, and whether the house is one story, has air conditioning, a deck, or a pool. Location Characteristics include a measure of school quality, crime, average income, percent of residents with a bachelor's degree ($Pct_{Educated}$), percent black (Pct_{Black}), and number of homosexual coupled households ($Homosexual$). We follow convention and log

[2]Our individual house data for the Ohio area contains 2007 clusters at the census tract level.

the house price to accommodate non-linearity in housing prices. Our data set is gathered from the seven largest MSAs in Ohio so we also include a dummy variable for six MSAs, omitting Akron. Similar to models with simple interactions, where two continuous variables influence the variation in outcome jointly, a model with a triple interaction such as the one in equation (1) is specified when there is reason to believe that two 'moderator' variables (percent black and percent educated) jointly influence the relationship between the outcome (house price) and the running variable (number of homosexual couples).[3]

In a simple continuous by continuous variable interaction setup, one can observe how the slope of one continuous variable with respect to the outcome variable changes as the values of the second continuous variable change. In the specification above, the triple interaction allows us to compare the slope of one continuous variable (homosexual couples) on the outcome (house price) when the values of the 'moderators' vary. We follow the procedure in IDRE (2013) adapted from Dawson and Richter (2006) and set the values of both moderators (*Pct Black* and *Pct Educated*) to one standard deviation above and below the mean.

Using linear predictions obtained using the estimated coefficients, we calculate the association between changes in the number of homosexual couples and changes in house prices in areas with high and low levels of education, as well as high and low concentrations of blacks. High levels of education/blacks refer to one standard deviation above the mean, while low levels of education/blacks refer to one standard deviation below the mean. Consequently, we estimate the slope for four different scenarios: (1) highly educated and mostly white, (2) highly educated and relatively more black, (3) less educated and mostly white, and (4) less educated and relatively more black. We also calculate the intercepts for all four scenarios

[3]It is possible to econometrically interpret the influence of black households on house prices within areas with varying concentrations of homosexual coupled households. However, there is approximately 37% times the number of black households than homosexual coupled households and 212 times the number of white households than homosexual coupled households. If the preferences of homosexual couples are driving our results, it would imply that one additional black household in a given area is associated with a reduction in homosexual couples by at least 25% (to have the necessary net decrease in demand to reduce house prices). By a similar logic, interpreting this as prejudice by blacks against homosexual couples requires that the addition of one more homosexual coupled household be associated with a reduction in black households by only 0.6% in order to observe a net decrease in the equilibrium house price.

and test whether these and the slopes are statistically different.[4]

3.1 Data

Our dataset is comprised of housing transaction data from the seven Metropolitan Statistical Areas (MSA) in Ohio. The data set was originally developed by Brasington and Hite (2005); Brasington and Haurin (2006) and, after merging with census tract data, is comprised of 93,450 real estate transactions in the year 2000. The data set contains information on the number of bedrooms, bathrooms, square feet, age and other housing characteristics as well as relevant neighborhood characteristics. The percent of black households and number of homosexual coupled households come from the 2000 Census. The Census does not ask individuals directly about their sexual orientation, but beginning with the 1990 Census it has been possible to identify unmarried homosexual households.[5] Gay and lesbian households are identified from the "relationship to household head" heading on the Census. The categories under this heading are spouse, child, inlaw, other non-relative and unmarried partner, which has been taken to represent gay and lesbian households when they are the same gender.[6]

However, the Census automatically recodes those who report themselves as homosexual married couples to same-sex unmarried couples. Black et al. (2007) find that most of these classified homosexual married couples are actually heterosexual married couples that have misclassified themselves. Leaving these observations may result in an inflated count of same sex couples and may bias the results if not addressed. We follow the suggestion by Gates and Steinberger (2010) and do not count classified homosexual couples for which at least one of the members of the household had their marital status changed by the Census. For each PUMA in our sample, we calculate the proportion of all homosexual coupled households which neither person has had his or her marital status imputed. We then multiply the census summary file count of homosexual couples for each census tract by the proportion

[4]See IDRE (2013) for a complete description of the difference in slope approach using Stata or SAS.

[5]Only partnered households are used since single homosexuals are not identified in the Census.

[6]See Black et al. (2000) and Carpenter (2004) for an in depth discussion on identifying gay and lesbian households using the Census.

that corresponds to the PUMA in which that census tract is located, following Gates and Steinberger (2010).[7]

Designation of an area as a "black neighborhood" is not settled in the literature, but estimates typically run from neighborhoods with at least 10% black households or more to a strong majority of over 90%. Recently, Myers (2004) designates an area as black if there are more than 30% black households. Instead of designating arbitrary concentrations we consider an area (census tract) to have a high concentration of educated and black, respectively, if the concentration is at least one standard deviation above the mean percent. Similarly, low concentration areas are those at least one standard deviation of concentration below the mean percent.

The concentration of homosexual coupled households ranges from 0 to 11.5 out of 1,000 households, with the mean number approximately 2 for every 1,000. Black households, on the other hand, range from 0 to 985 out of 1,000 with a mean of 194 out of 1,000. Within our sample, 6.88% of census tracts do not have any homosexual couples, 1.09% do not have any black households, and 0.45% do not have any homosexual coupled households nor black households. There are 6.43% of census tracts that contain at least one black household and no homosexual coupled households and 0.65% for the reverse restriction. The data for the rest of the control variables included in the analysis come from the Brasington data set or the summary files of the 2000 Census. Descriptive statistics of the variables can be found in Table 1.

[*Insert Table 1 here.*]

4 Results

Results obtained from estimating the model described in equation 1 can be found in Table 2. As expected, housing amenities positively influence house price while disamenities are associ-

[7]We use 5% IPUMS to identify potentially incorrectly identified homosexual couples because this is the smallest geographic unit available for this data (Steven Ruggles and Sobek, 2010).

ated with lower house prices. House size, yard size, fireplace, garage, bedrooms, bathrooms, pool, deck, being one story, higher school quality and higher average income are associated with higher house prices. House age, crime, distance to the central business district and distance to the nearest environmental hazard are negatively associated with house prices, although the latter is statistically insignificant.

[*Insert Table 2 here.*]

Percent of college graduates is positive and significant while percent of black residents is negative and significant, confirming previous findings. Number of homosexual coupled households is negatively associated with house prices, but it becomes a positive influence when interacted with college graduates and, separately, percent black. Likewise, the interaction term between percent black and percent of college graduates is positive and significant. Our variable of interest, the triple interaction between college educated, percent black and percent of homosexual couples, is negative and significant.

To ensure we are considering areas that have a relatively high proportion of homosexual coupled households and black residents, we also separately limit our sample to those houses located within the central cities of each of the Metropolitan Statistical Areas. These results are presented in Table 3. Our variable of interest, the triple interaction term, remains negative and significant.[8]

[*Insert Table 3 here.*]

The influence of homosexual couples on average house prices can be inferred by considering the marginal effect, which is found by considering the coefficients on the individual variable and all interaction terms. The interpretation of the sign and coefficient of interaction terms in general must be made with care. The triple interaction term suggests that, holding percent black and percent of college graduates constant, an additional homosexual couple is associated with lower house prices. However, the calculated marginal effect must also incorporate the additional influence that each variable has separately on house prices.

[8] As an alternative to clustered standard errors, we employ a spatial autoregressive estimation procedure. This estimation yields results consistent with the findings presented and are available upon request.

In this way we can consider the influence of homosexual coupled households on average house prices for different area compositions of percent black and percent with a college degree.

The marginal effect of an additional homosexual couple is calculated by considering all direct and indirect influences the couple has on house prices. Consequently, setting the percent of black residents and percent of residents with a college degree at fixed levels, the net effect of additional homosexual couples is given by:

$$\begin{aligned}\frac{\partial Ln(HousePrice)}{\partial HomosexualCouple} &= \beta_{HomosexualCouple} + \beta_{HomoSexual*Black} * (\overline{PercentBlk}) \\ &+ \beta_{HomoSexual*Educated} * (\overline{PercentEduc}) \\ &+ \beta_{HomoSexual*Blk*Educ} * (\overline{PercentBlk}) * (\overline{PercentEduc})\end{aligned} \tag{2}$$

To compare the influence of education on attitudes towards homosexuals, we can consider the marginal effect at different levels of percent black and percent with a college degree. Specifically, we consider the influence in areas with one standard deviation above and below the mean percent concentration of black and those with a college degree. For illustrative purposes we specify the model with and without the triple interaction. The calculated marginal effects when only including the interaction between homosexual couples and percent with a college degree and the interaction between homosexual couples and percent of blacks are given in Table 4.

[*Insert Table 4 here.*]

We find that in areas where the percent of the population with a bachelor's degree or higher is one standard deviation above the mean, there is a positive association between the number of homosexual couples and house values. However, when the percent of the population that has at least a bachelor degree is one standard deviation below the mean, there is a consistent *negative* influence of homosexual couples on average house prices. This result supports the survey findings that holding a bachelor's degree is correlated with attitudes indicative of increased tolerance. This correlation exists for revealed attitudes, suggesting

that it is not pure socialization driving the stated preference findings.

With respect to the interaction between the proportion of blacks and the number of homosexual couples, our results suggest that the influence of homosexual couples is positive in general. For areas with one standard deviation below the mean proportion of blacks the influence is a smaller positive influence than for areas with one standard deviation above the mean proportion of black. This suggests that the positive influence of homosexual couples on average house price decreases as the proportion of blacks increases.[9]

The calculated marginal effects when a triple interaction between percent with a college degree, number of homosexual couples and percent of black residents are included in Table 5. We find a significantly different trend in areas with high and low levels of percent with a college degree. In areas with lower percent educated, the negative influence of homosexual couples is less as the proportion of black *increases* whereas the positive influence in areas with high percent educated *decreases* with the percent of black residents. This suggests that in highly educated areas, blacks are relatively less welcoming towards homosexual couples while in low educated areas, blacks are relatively less intolerant.

In addition to the calculated marginal effects, we also compare the magnitudes of the marginal effects to ensure that they are statistically different from one another. These differences can be found in Table 6 and confirm that the effects detailed above are statistically supported.

[*Insert Table 6 here.*]

In dollar terms, an increase in the number of homosexual couples is associated with a reduction in average house prices of approximately $2,999 in low percent black and low percent college graduates but only a $1,430 reduction in areas with relatively high concentrations of black and low percent college graduates. For areas with a high percent of college graduates and low percent of black residents, there is an associated increase in average house prices of approximately $2,773 from an increase in homosexual coupled households but only a $1,219

[9]This influence becomes a negative influence for areas with very high proportions of blacks.

associated increase in areas with a high percent of black residents.

Comparing the differences between areas with relatively high and low levels of percent of residents with a bachelors degree, there is significantly more variation between areas with higher concentrations of whites ($5,772) than with relatively higher concentrations of black ($2,649). The lower variation is consistent with previous findings of homophily among black college students. College does seem to be associated with a revealed increased tolerance towards homosexuals but this change is less pronounced for blacks. Consequently, even though among less educated areas a higher concentration of blacks is associated with a *smaller* negative influence of homosexual couples, this relative racial gap is reversed within higher educated areas.

5 Conclusion

We use housing prices from Ohio to examine whether revealed attitudes of tolerance towards homosexuals is influenced by education differently for areas with relatively high percent of black residents compared to areas with a relatively high percent of white residents. Stated preference survey findings suggest that graduating college is associated with higher levels of tolerance (Bobo and Licar, 1989; Nunn et al., 1978) and our results are consistent with these findings. On average, areas that have above the mean percent of college graduates there is a positive associated influence of an increased number of homosexual couples on house prices. In areas with below average levels of college graduates, on the other hand, there is a negative associated influence.

To our knowledge, our analysis is the first to confirm that this perceived "tolerance gap" is manifested in behaviors (i.e. willingness to pay for a house) rather than just stated preferences. This suggests that the sorting and/or cognitive development hypothesis of educational influence on tolerance, rather than socialization alone, largely explains current findings. Furthermore, we explore the racial dimension of the associated influence of education. Increasing

concentrations of black residents is associated with a lower negative influence of additional homosexual coupled households on average house prices in areas where the percent of college graduates is relatively low. This suggests that the intolerance observed in lower educated areas is less pronounced in areas with higher concentrations of black residents.

In areas where the percent of college graduates is relatively high, we observe an opposite trend. Increasing concentrations of percent of black residents are associated with a less revealed tolerance towards homosexual couples. Taken together, education does appear to be associated with a greater tolerance towards homosexuals, but education appears to be less influential in areas with a higher percent of black residents. In areas with below average percent of college graduates there is less observed intolerance towards homosexuals in areas with relatively more black residents but also a smaller positive influence in areas with above average percent of college graduates. The smaller variation in attitudes between low and high percent college graduates within high concentrations of black residents may be due to greater levels of homophily by blacks while in college. If homophily explains the smaller associated influence of college, this may have implications for possible racial gaps in the acquisition of other social behaviors typically acquired in college.

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Table 1: Definition and Source of Variables

Variable	Definition	Mean	St. Deviation	Min	Max
Brasington Data[a]					
Ln(Price)	Natural Log of price of house	11.67	0.56	10.30	15.98
Age	Age of house in hundreds of years	0.42	0.31	0	2
Lot Size	Lot size of house in ten thousands of square feet	2.07	5.27	0.05	348.48
House Size	Building size of house in thousands of square feet	1.63	0.70	0.50	12.20
Air Conditioning	House has AC	0.28	0.45	0	1
Deck	House with a Deck	0.10	0.30	0	1
Garage	House with a Garage	0.62	0.48	0	1
Swimming Pool	House with Swimming Pool	0.02	0.13	0	1
Fireplace	House has a fireplace	0.43	0.49	0	1
One Story	House with only one story	0.43	0.49	0	1
Full Baths	Number of full baths in house	1.45	0.60	0	9
Half Baths	Number of half baths in house	0.45	0.54	0	8
Distance to Hazard	Distance from house to nearest pollution source in miles	1.18	0.93	0.003	8.78
School Quality	Pass rate on 9^{th} grade proficiency test in school district	64.32	19.50	19.60	98.00
Crime Rate	Offenses per thousand persons in police district	64.81	42.34	0.97	735.34
Median Income	Family Median income in the Census Group	$60,658	$22,722	0	$200,000
Census Variables[b]					
Graduate Degree	Proportion of individuals 25+ years old with a Bachelors' degree in Census Tract	0.26	0.16	0	0.79
Percent Black	Percent of black individuals in Census Tract	10.12	19.41	0	98.70
Same-Sex Households	Number of same-sex coupled households per 1,000 households	2.28	1.89	0	11.50
Distance to CBD[c]	Distance from house to CBD in miles	12.10	8.39	0.036	51.90

Additional Statistics	
Total number of tracts with house sales	2,007
Average number of houses sold per census tract	49.04
Percent of tracts with No Same-Sex Couples	6.88
Percent of tracts with No Black Households	1.09
Percent of tracts with No Same-Sex Couples and No Black hhld	0.45
Percent of tracts with at least one Same-Sex hhld and no Black hhld	0.65
Percent of tracts with at least one Black hhld and no Same-Sex hhld	6.43

[a] Variables from the Brasington Housing Transaction Data Set for 2000.
[b] Variables come from the 2000 Census Summary File and based on author's calculation using IPUMS.
[c] Author's calculation using x,y-coordinates provided by the Brasington data set.

Table 2: Estimates of the Impact of House and Neighborhood Characteristics, and Number of Same-Sex Couples on the Ln(House Sale Price)

	(1)		(2)		(3)		(4)	
Constant	10.64606	***	10.69579	***	10.63392	***	10.71101	***
	(0.026383)		(0.026072)		(0.026998)		(0.026778)	
Dist. CBD	-0.00159	***	-0.00226	***	-0.00153	***	-0.00233	***
	(0.0005166)		(0.0005155)		(0.0005157)		(0.0005182)	
Age House	-0.40815	***	-0.41125	***	-0.40826	***	-0.41662	***
	(0.0319198)		(0.0311487)		(0.031829)		(0.0313484)	
Age House Sq.	0.123827	***	0.123458	***	0.124545	***	0.126999	***
	(0.0229225)		(0.0216659)		(0.0227245)		(0.0217493)	
Sqft	0.373889	***	0.378074	***	0.375945	***	0.37727	***
	(0.0101123)		(0.0100599)		(0.010115)		(0.0100756)	
Sqft Squared	-0.01779	***	-0.01799	***	-0.01799	***	-0.01783	***
	(0.0019489)		(0.0019292)		(0.0019439)		(0.001934)	
Lot Size	0.012026	***	0.011997	***	0.011996	***	0.012005	***
	(0.0005713)		(0.0005743)		(0.0005705)		(0.0005758)	
Lot Size Sq.	-3.7E-05	***	-3.7E-05	***	-3.7E-05	***	-3.7E-05	***
	(0.00000476)		(0.00000478)		(0.00000474)		(0.00000479)	
Air Cond	-0.00239		-0.00648		-0.00288		-0.007	
	(0.006724)		(0.0065344)		(0.0066868)		(0.0065328)	
Fireplace	0.051353	***	0.053469	***	0.05184	***	0.053312	***
	(0.003665)		(0.0036323)		(0.0036595)		(0.0036283)	
Garage	0.056995	***	0.055395	***	0.05641	***	0.056133	***
	(0.0055232)		(0.0053577)		(0.005494)		(0.005387)	
Deck	0.036522	***	0.038395	***	0.037519	***	0.037917	***
	(0.0049129)		(0.0048079)		(0.0049113)		(0.0047868)	
Pool	0.080975	***	0.079003	***	0.080424	***	0.079009	***
	(0.0090521)		(0.0089808)		(0.0090388)		(0.0089827)	
One Story	0.046754	***	0.0448	***	0.047278	***	0.044351	***
	(0.0043355)		(0.0042034)		(0.004319)		(0.0041982)	
Full Bath	0.065325	***	0.064766	***	0.065244	***	0.064763	***
	(0.0042881)		(0.0042935)		(0.004287)		(0.0042903)	
Part Bath	0.054928	***	0.053551	***	0.054969	***	0.053035	***
	(0.0030065)		(0.0029613)		(0.002997)		(0.0029652)	
School Quality	0.001469	***	0.001591	***	0.00155	***	0.001593	***
	(0.0002451)		(0.0002408)		(0.0002475)		(0.0002441)	
Income	3.07E-06	***	3.07E-06	***	3.06E-06	***	3.08E-06	***
	(0.000000192)		(0.000000182)		(0.000000189)		(0.00000018)	
Dist. Hazard	2.76E-05		-9.7E-05		0.000274		-0.0005	
	(0.003373)		(0.0033519)		(0.0033785)		(0.0033481)	
Crime	-0.00028	***	-0.00024	***	-0.00028	***	-0.00023	*
	(0.0000872)		(0.0000854)		(0.0000882)		(0.0000849)	
Cincinnati Dummy	-0.00754		-0.0067		-0.00779		-0.00716	
	(0.0125274)		(0.0121882)		(0.0124903)		(0.0121225)	
Cleveland Dummy	0.083269	***	0.082833	***	0.08208	***	0.084081	***
	(0.0119629)		(0.011754)		(0.0119023)		(0.0116895)	
Columbus Dummy	-0.0199		-0.01456		-0.02195		-0.01531	
	(0.0128717)		(0.0125714)		(0.0127971)		(0.0125194)	
Dayton Dummy	-0.12716	***	-0.1251	***	-0.12763	***	-0.12529	***
	(0.0130842)		(0.012915)		(0.013051)		(0.0128796)	
Toledo Dummy	-0.07628	***	-0.07528	***	-0.07687	***	-0.07487	***
	(0.0144484)		(0.0142168)		(0.0144234)		(0.0141181)	
Youngstown Dummy	-0.22465	***	-0.23915	***	-0.22433	***	-0.24033	***
	(0.0143593)		(0.0143287)		(0.0143742)		(0.0143138)	
Same-Sex Couples (*SS*)	0.016103	***	-0.02899	***	0.022305	***	-0.03974	***
	(0.0035009)		(0.0043538)		(0.0041938)		(0.0060294)	
Pct. with Bach Degree (*College*)	0.55551	***	0.391675	***	0.547109	***	0.351601	***
	(0.0329371)		(0.0374993)		(0.0332571)		(0.04011)	
Pct. Black	-0.00236	***	-0.00215	***	-0.00177	***	-0.00319	***
	(0.0001469)		(0.0001375)		(0.0002065)		(0.00032)	
SS × College			0.117179	***			0.145729	***
			(0.0125711)				(0.0146666)	
SS × Pct. Black					-0.00037	***	0.000619	***
					(0.0001076)		(0.0001619)	
Pct. Black × College							0.004937	***
							(0.001914)	
SS × Pct. Black × College							-0.00242	**
R-Squared	0.7530		0.7556		0.7533		0.7559	

Notes: 93,450 observations. *** is significance at the 1% level, ** at the 5% level, and * at the 10% level. Robust standard errors clustered at the census tract level are reported in parenthesis (2,007 clusters). All specifications use house transactions in the 7 largest MSAs in Ohio for the year 2000, and all include MSA dummies.

Table 3: Estimates of the Impact of House and Neighborhood Characteristics, and Number of Same-Sex Couples on the Ln(House Sale Price)- Using observations within the City Center Only

	(1)		(2)		(3)		(4)	
Constant	10.94271	***	10.99197	***	10.92951	***	11.00383	***
	(0.0909419)		(0.0884037)		(0.0907633)		(0.0899005)	
DistanceCBD	-0.00334		-0.0039		-0.00352		-0.00353	
	(0.0037417)		(0.0035149)		(0.0037052)		(0.0034866)	
AgeHouse	-0.68773	***	-0.65964	***	-0.68852	***	-0.66999	***
	(0.0618038)		(0.0585794)		(0.0605568)		(0.0588642)	
AgeHouseSq.	0.242282	***	0.215177	***	0.242188	***	0.220235	***
	(0.0491598)		(0.0436958)		(0.0473292)		(0.0440892)	
Sqft	0.336578	***	0.343021	***	0.339141	***	0.342716	***
	(0.0230369)		(0.0229868)		(0.0232843)		(0.0232553)	
Sqft Sq.	-0.01284	**	-0.01308	**	-0.01281	**	-0.01299	**
	(0.0055728)		(0.0055752)		(0.005622)		(0.0056331)	
Lot Size	0.065296	***	0.065007	***	0.064732	***	0.065369	***
	(0.0066288)		(0.00652)		(0.0066196)		(0.0065199)	
Lot Size Sq.	-0.0014	***	-0.00139	***	-0.00139	***	-0.0014	***
	(0.0001783)		(0.0001776)		(0.0001775)		(0.0001776)	
Air Cond.	0.027433	***	0.015181		0.023163	**	0.017001	*
	(0.0111668)		(0.010635)		(0.0108411)		(0.0105347)	
Fireplace	0.046562	***	0.050779	***	0.047497	***	0.051155	***
	(0.0058785)		(0.0058492)		(0.0058909)		(0.0058271)	
Garage	0.062955	***	0.064144	***	0.064641	***	0.06584	***
	(0.0082189)		(0.007959)		(0.0080446)		(0.0079765)	
Deck	0.062223	***	0.065273	***	0.064408	***	0.064162	***
	(0.0109841)		(0.0109867)		(0.0110853)		(0.0110613)	
Pool	0.081911	**	0.077216	**	0.080061	**	0.075508	**
	(0.0341012)		(0.0327387)		(0.0337393)		(0.0327104)	
One Story	0.021907	***	0.018875	**	0.021793	***	0.019131	**
	(0.0083394)		(0.0079724)		(0.0081955)		(0.0079823)	
Full Bath	0.056052	***	0.056272	***	0.056321	***	0.057212	***
	(0.0083958)		(0.0083502)		(0.0083913)		(0.0083418)	
Part Bath	0.037769	***	0.037864	***	0.037827	***	0.038522	***
	(0.0057223)		(0.0055639)		(0.0056598)		(0.0055469)	
School Quality	-0.00231	***	-0.00205	***	-0.0022	***	-0.00209	***
	(0.0004898)		(0.0004645)		(0.0004777)		(0.0004613)	
Income	4.62E-06	***	4.47E-06	***	4.58E-06	***	4.41E-06	***
	(0.000000391)		(0.000000342)		(0.000000376)		(0.000000344)	
Dist. Hazard	-0.00881		-0.00684		-0.00822		-0.00736	
	(0.0086602)		(0.0083385)		(0.0085604)		(0.0083383)	
Crime	-0.00224	***	-0.0023	***	-0.00221	***	-0.00226	***
	(0.0008001)		(0.0008)		(0.0008036)		(0.0008118)	
Cincinnati Dummy	0.12574	***	0.144771	***	0.127896	***	0.146813	***
	(0.0306223)		(0.0295591)		(0.0303932)		(0.0296378)	
Cleveland Dummy	0.143135	***	0.147138	***	0.133973	***	0.147264	***
	(0.0317878)		(0.0308872)		(0.0320393)		(0.0314291)	
Columbus Dummy	0.080555	**	0.103326	***	0.079476	**	0.096164	**
	(0.0408159)		(0.0398619)		(0.0408568)		(0.0404012)	
Dayton Dummy	-0.03999		-0.0175		-0.03987		-0.01981	
	(0.045001)		(0.0440935)		(0.0450562)		(0.04468)	
Toledo Dummy	0.010128		0.010902		0.007177		0.009539	
	(0.0342594)		(0.033739)		(0.034401)		(0.0340395)	
Youngstown Dummy	-0.36028	***	-0.3676	***	-0.36217	***	-0.36845	***
	(0.0254402)		(0.0247029)		(0.0258987)		(0.0243069)	
Same-Sex Couples (*SS*)	0.018064	***	-0.01437	***	0.024713	***	-0.02197	***
	(0.0035193)		(0.0048968)		(0.004425)		(0.0071582)	
Pct. with Bach Degree (*College*)	0.751616	***	0.539712	***	0.726913	***	0.524555	***
	(0.0485162)		(0.0660665)		(0.0495963)		(0.0725443)	
Pct. Black	-0.0015	***	-0.00155	***	-0.00092	***	-0.00196	***
	(0.00016)		(0.0001513)		(0.0002386)		(0.0003835)	
SS × College			0.08531	***			0.10615	***
			(0.0150005)				(0.0182599)	
SS × Pct. Black					-0.00034	***	0.00041	***
					(0.0001159)		(0.0001756)	
Pct. Black × College							0.00033	
							(0.0025822)	
SS × Pct. Black × College							-0.00154	*
							(0.0008745)	
R-Squared	0.7285		0.7325		0.7296		0.7329	

Notes: 45,591 observations. *** is significance at the 1% level, ** at the 5% level, and * at the 10% level. Robust standard errors clustered at the census tract level are reported in parenthesis (1,028 clusters). All specifications use house transactions in the 7 largest MSAs in Ohio for the year 2000.

Table 4: Marginal Effects Estimates of Same-Sex Couples on Ln(House Prices) for Specifications with Double Interactions Only

	Entire Sample		Central City Only	
Relative Education				
High[a]	0.020855	***	0.018362	***
	(0.0033)		(0.0037)	
Average	0.001704		0.004326	
	(0.0027)		(0.0032)	
Low[b]	-0.017448	***	-0.009710	**
	(0.0035)		(0.0043)	
Relative Racial Composition				
Relatively Black[a]	0.011364	***	0.006875	*
	(0.0029)		(0.0041)	
Average	0.018559	***	0.016639	***
	(0.0035)		(0.0031)	
Relatively White[b]	0.022305	***	0.024713	***
	(0.0035)		(0.0043)	

Notes: Authors' calculations. *** is significance at the 1% level, ** at the 5% level, and * at the 10% level.

[a] One standard deviation above the mean

[b] One standard deviation below the mean

Table 5: Marginal Effects Estimates of Same-Sex Couples on Ln(House Prices) for Specification with Triple Interaction

	Entire Sample		Central City Only	
More Educated[a]				
Relatively Black[a]	0.010109	*	0.009333	
	(0.0061)		(0.0101)	
Relatively White[b]	0.022254	***	0.018768	***
	(0.0034)		(0.0042)	
Less Educated[b]				
Relatively Black	-0.014144	***	0.000742	
	(0.0035)		(0.0054)	
Relatively White	-0.025381	***	-0.016161	**
	(0.0049)		(0.0110)	

Note: Authors' calculations. *** is significance at the 1% level, ** at the 5% level, and * at the 10% level.

[a] One standard deviation above the mean

[b] One standard deviation below the mean

Table 6: Differences in Marginal Effects (Using Triple Interaction)

	Entire Sample		Central City Only	
White vs. Relatively Black				
More Educated[a]	-0.012145	*	-0.009435	
	(0.0067)		(0.0114)	
Less Educated[b]	0.011236	***	0.016903	**
	(0.0031)		(0.0073)	
More vs. Less Educated				
Relatively White[b]	0.047634	***	0.034929	***
	(0.0048)		(0.0060)	
Relatively Black[a]	0.024253	***	0.008591	
	(0.0071)		(0.0131)	

Notes: Authors' calculations. *** is significance at the 1% level, ** at the 5% level, and * at the 10% level.
[a] One standard deviation above the mean
[b] One standard deviation below the mean

Table 7: Change in Average House Prices Associated with Additional Homosexual Coupled Households

	Entire Sample	Central City Only
	Mean Price	Marginal Effect
More Educated[a]		
Relatively Black[a]	$120,636	$1,219
Relatively White[b]	$124,588	$2,773
Less Educated[b]		
Relatively Black	$101,073	-$1,430
White	$118,167	-$2,999

Notes: Authors' calculations.
[a] One standard deviation above the mean
[b] One standard deviation below the mean